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Salt Lake County  
in



THE NATIONAL  
CHILDREN'S  
STUDY

HEALTH GROWTH ENVIRONMENT

[www.nationalchildrensstudy.gov](http://www.nationalchildrensstudy.gov)



# What is the National Children's Study?

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- Define the interaction of environment and genetics in health and development of 100,000 children from conception to 21 years
- Collaborative project with:
  - Federal Government EPA, NIH, and CDC
  - University of Utah, Primary Children's
  - State and local government
  - Community partners: hospitals, physicians
  - schools, advocacy groups, neighborhoods



# The Annual Cost of Child Disease

## \$758.7 Billion

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→ Injury	\$480 Billion
→ Obesity	\$117 Billion
→ Diabetes	\$132 Billion
→ Asthma	\$ 14 Billion
→ Neurodevelopment	\$ 9 Billion
→ Low Birth Weight	\$ 6 Billion



# The Environment: Home, School and Work

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- Biological and chemical agents
- Physical surroundings
- Social interactions
- Behavioral influences and outcomes
- Genetics
- Cultural and family influences

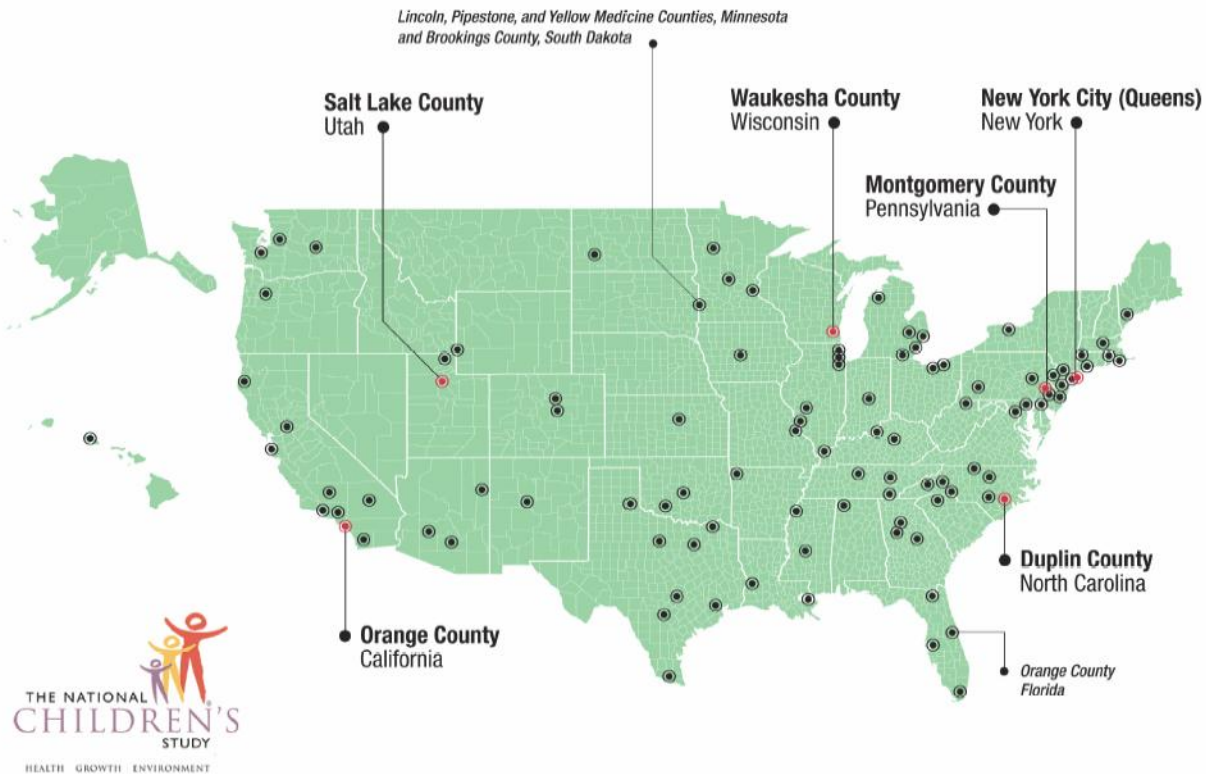
# 105 Sample Sites

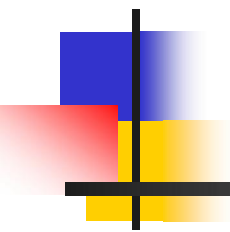
## 6 Vanguard Locations

### National Children's Study Locations

Vanguard locations: Study Centers awarded (bold)

Vanguard locations: Study Centers pending award (*italic*)





# NCS Vanguard Site: Salt Lake County, UT

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Subsequent Study Sites:  
Cache County, UT  
Bear Lake County, ID  
Lincoln County, WY



# Unique Aspects of the NCS

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- Broad approach to the US environment
- Long-term commitment to the community
- Results made public during the study
- Partnership with multiple government agencies, as well as from public organizations and private
- State-of-the-art technology
- Community based



# Children are Vulnerable !

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- Not small adults
- Critical times of vulnerability during development
- Immature mechanisms for detoxification and protection
- Differences in metabolism and behavior that may yield a higher exposure





# Outcome Priorities

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- Pregnancy Related
- Injury
- Asthma
- Obesity, Diabetes, Physical Development
- Child Development and Mental Health



# Pregnancy Related Outcomes

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- Does impaired glucose metabolism during pregnancy increase the risk of birth defects?
- Is pre-term birth caused by inflammation and infection



# Injury

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- Do innate characteristics like heart rate, biologic reactivity and genetics with parenting and peer environment influence risk taking, aggressive behavior and unintentional injury?
- Does repeated head trauma adversely affect neurodevelopment?



# Asthma

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- Does indoor and/or outdoor air pollution cause asthma?
- Is early-life infection associated with asthma risk?
- Does a vitamin rich diet help decrease asthma risk?



# Obesity Diabetes and Physical Development

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- Does impaired maternal glucose metabolism during pregnancy cause overweight in children?
- Does breastfeeding reduce the risk of obesity
- How does a low fiber and high sugar diet increase risk for obesity and diabetes?
- Does physical environment help prevent obesity?

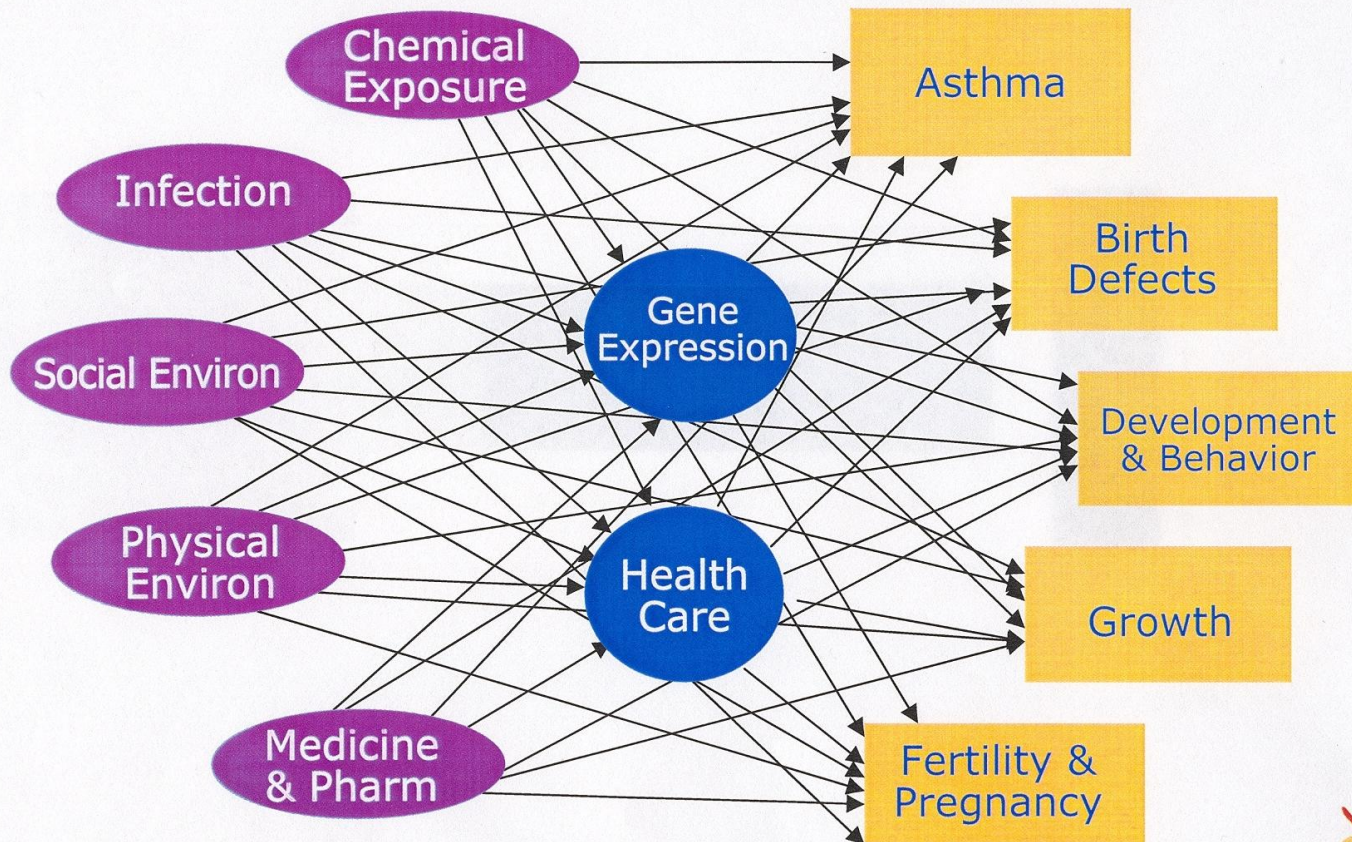


# Child Development and Mental Health

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- How does low-level pesticide exposure affect development and performance?
- Are early exposure to neurotoxicants associated with developmental and mental health anomalies like autism and mental retardation?
- How do early childhood experiences affect later learning?

# Associations and Interactions





# Genetics

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→ In what ways do environmental factors intersect with genes?





# Physical Environment

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- Do housing quality and neighborhood and community conditions affect child health and development?
- Does household mold exposure in the first year of life lead to asthma?
- Does school environment factors trigger asthma symptoms?



# Chemical Environment

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- What happens to human organism after long periods of low dose exposure to chemical, pesticides and herbicides?
- What are the health effects associated with complex low level exposures?



# Psychosocial Environment

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- How do social environmental factors contribute to diseases?
- Does chronic exposure to urban violence exacerbate asthma?
- How do differences in social environment produce health disparities between urban and rural children?



# Biologic Environment

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- Do chemical toxicants consistently suppress immunity and facilitate infections?
- Do specific infections incite heart disease?
- Does perinatal infection increase risk of cerebral palsy and autism?
- What factors during pregnancy are associated with an increased risk of schizophrenia?



# Sample Study Questions:

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Can very early exposure to allergens keep children asthma-free?

Do genes and environment interact to promote or prevent violent behavior in teenagers?

Are lack of exercise and poor diet the only reasons why many children are overweight?

Do infections impact developmental progress, asthma, obesity, and heart disease?

Does neighborhood planning and construction encourage or discourage injuries?

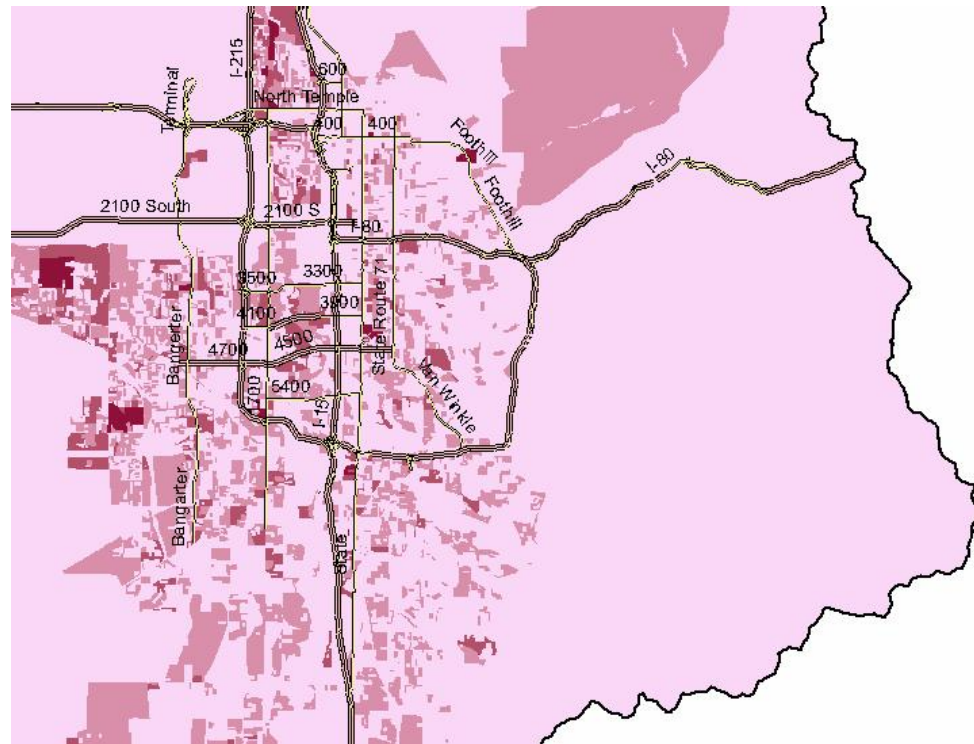


# How is the Study Done?

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- Women enrolled prior to or early in pregnancy
- Comprehensive assessment including genetics, environment and biologic samples
- Careful follow up during and after delivery
- Periodic evaluation through early childhood: development, nutrition, social interactions,
- Educational assessment including progress and environment

# Salt Lake County Births by Census Block





# Utah NCS Research Team

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- 96 professionals
- Study coordinators
- Industrial hygienists
- Psychologists, early childhood specialists
- Community advocates, translators
- Pediatricians and perinatologists
- Myriad of support staff





# What will the study provide?

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- **Data** to address concerns about exposure to potential toxicants
- **Statistical** power to determine harmful, harmless, or beneficial effects of exposures
- **Causal factors** for many diseases and conditions of childhood



# What will the study provide?

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- **Information** on how multiple causes interact to result in multiple outcomes
- **Translation** of the human genome to clinical practice
- **Identification** of early life factors that contribute to adult conditions
- **National resource** to answer future questions   Data Bank



# Projected Time Line

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<b>Aug 2005</b>	<b>Selection of initial 3 sites</b>
<b>2005-2007</b>	<b>Pilot studies and process</b>
<b>Spring 2008</b>	<b>Enrollment to yield 250 live births/year</b>
<b>Spring 2010</b>	<b>Extend to Cache, Bear River and Lincoln Counties</b>
<b>2010-2012</b>	<b>First preliminary results available</b>
<b>Dec 2012</b>	<b>Complete enrollment in Salt Lake County</b>
<b><i>Periodically</i></b>	<b>Analyze data as collection continues, publish early results</b>
<b>~2033</b>	<b>Analyses complete</b>



# Why Salt Lake County?

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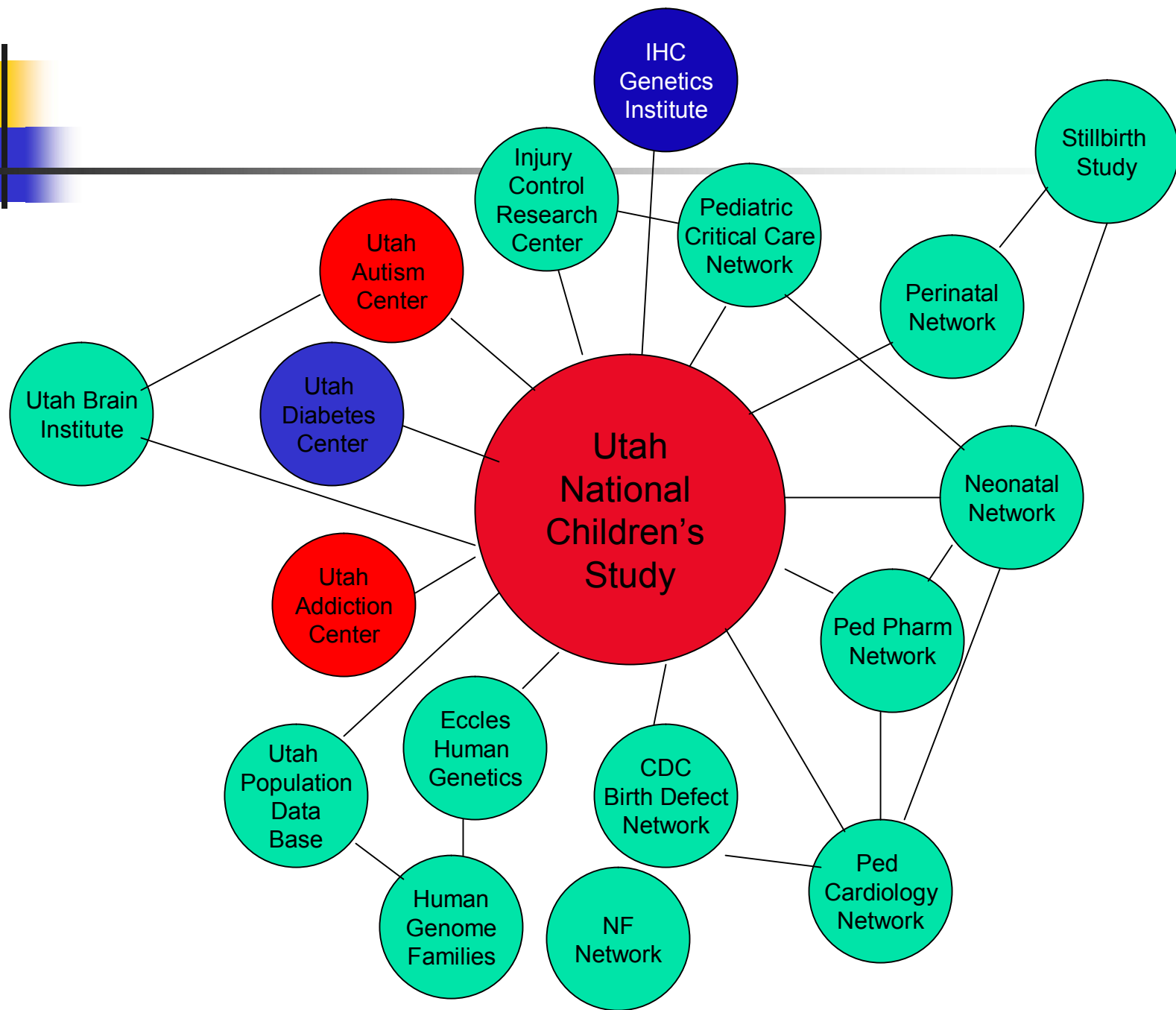
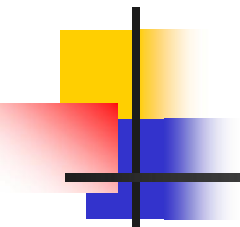
- Dynamic Population – 18,350 births in 2004
- Ethnically diverse
  - 12% Hispanic
  - 2.9% Asian, Pacific Islanders
  - 0.9% Native American
- Access to 3 to 4 generations
- Stability - families remain in Utah
- Experience with long term studies



# Strong Utah Collaborations

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- Our families: parents and children, communities, advocacy organizations
- Major health care providers: University Utah, IHC, Iasis and St. Mark's Hospital
- Our schools
- State and local health departments
- Federal agencies: NIH, CDC and EPA,
- Employers and the media
- Our Faith groups





# Promise of the Future

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The National Children's Study will form the basis of child health guidance, interventions and policy for generations to come.



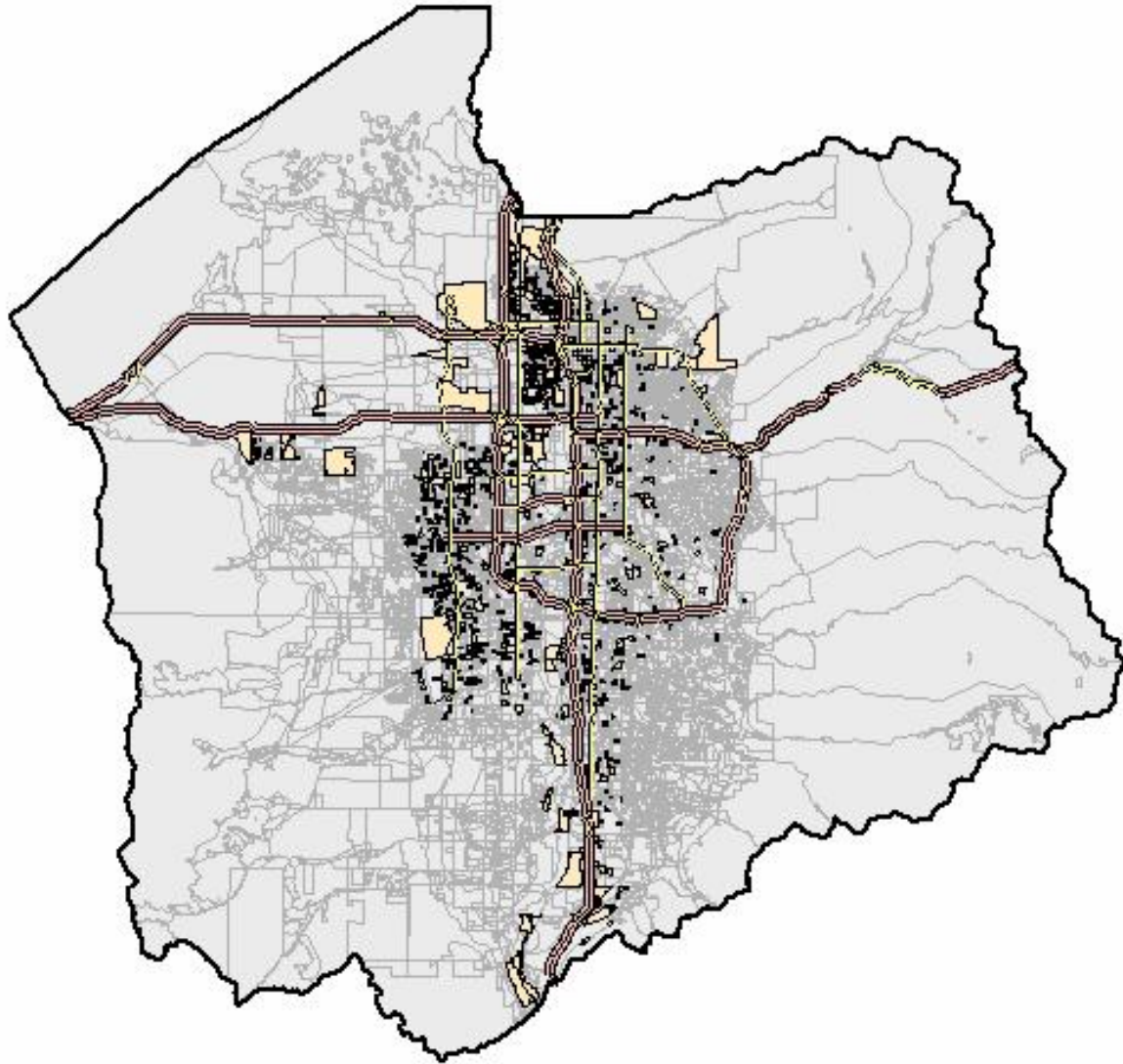
# Salt Lake County in



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# Proposed Salt Lake County Sampling Sites



# Salt Lake County Births by Census Block

